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AMERICAN TRICHOPTERA—NOTES AND DESCRIPTIONS.

BY NATHAN BANKS, EAST FALLS CHURCH, VA.

In the following pages are descriptions of various new caddice-flies, mostly from my own collection. I have given a new arrangement of the genera of the Hydropsychidæ based on a salient, but hitherto unused character, which makes the classification of this family easier than before.

PHRYGANEIDÆ.

Neuronina smithi, n. sp. (Pl. VIII, fig. 11).

In general similar to *N. concatenata*, but the irrorations on the wing a little further apart, and much less wavy; the vertex wholly pale yellowish, the thoracic notum also pale, but rather dark each side. Venation generally as in *N. concatenata*, but the first fork does not reach half way back on discal cell (in *concatenata* much more than half way). The lower appendages of the male have the apical spine longer and less curved than in *N. concatenata*.

Expanse 23 mm.

From Lakehurst, N. J., 4th July (Englehart). Named in memory of the late Dr. J. B. Smith.

LIMNEPHILIDÆ.

Limnephilus spinatus, n. sp. (Pl. VIII, figs. 8, 9).

Palpi yellow; face dark, with yellow hairs, vertex and thorax dark, with some yellow hair and black bristles; antennæ brownish, the basal joints darker; abdomen black above and on the sides, vertex pale; legs yellow, with black spines, those on tibia 1 are very short; wings, except costal and subcostal areas, are brown, marked with pale spots, these most numerous in front and along the veins, basal part of apical cells pale, beyond the brown is densely spotted with minute pale dots, the usual median oblique mark is distinct; hind wings hyaline, venation yellowish. In the fore wings

the discal cell is no longer than the pedicel, and in hind wings the discal hardly reaches before the fork of the median.

Expanse 26 mm.

From Vineyard, Utah, 27th August (Spalding).

***Limnephilus productus*, n. sp. (Pl. X, figs. 29, 36).**

Palpi yellowish brown, face brown, with much golden yellow hair, and some black bristles; vertex brown, with yellow hair and brown bristles; antennae yellowish brown, basal joint darker; thorax with black bristles and yellow hair. Abdomen dull black, apex of segments paler; legs yellowish, spines black, those on tibia 1 very short. Wings mostly pale, but area behind median is dark brown, and more or less broken by pale spots, mostly along median vein, some dark spots along radius, longitudinal veins with dark streaks, a hyaline white mark on the thyridium and one on arculus; hind wings pale, with pale venation. In fore wings the discal cell barely reaches before the fork of median. In hind wings fork 5 is no longer than its pedicel, and in hind wings the discal cell begins a little before the posterior anastomosis.

Expanse 27 mm.

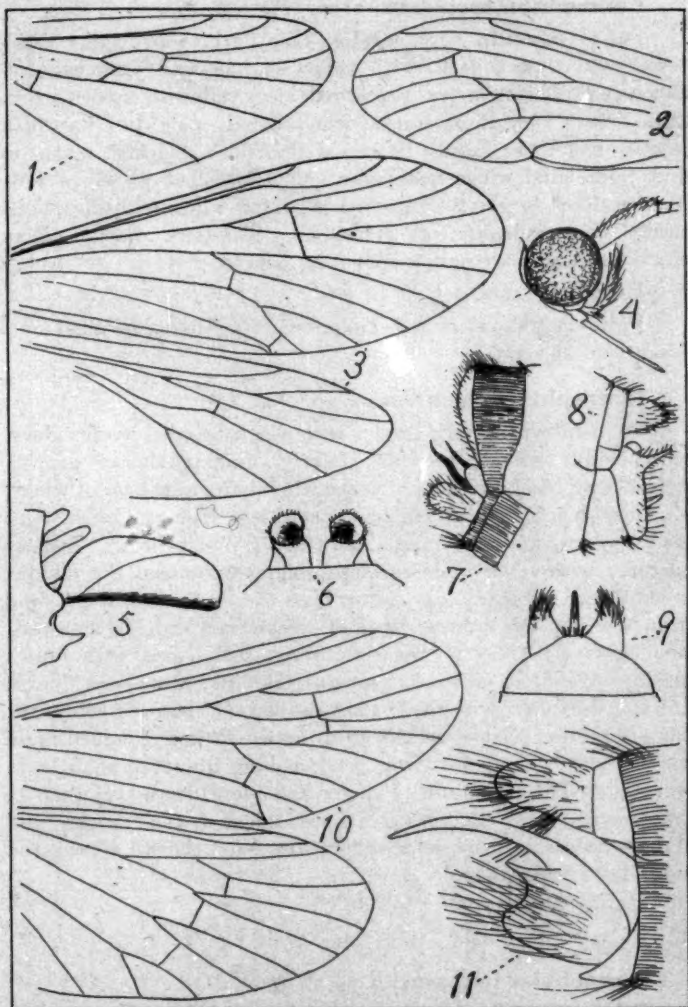
From Vineyard, Utah, 27th August, at sugar, (Spalding).

***Limnephilus æqualis*, n. sp. (Figs. 14, 31).**

Palpi pale, very slender, face with yellow hair; vertex darker in front, pale behind, with gray hair, and dark bristles, thorax pale above, with yellowish hair; abdomen pale yellowish, tips of male genitalia black; legs yellowish, with black spines, those on tibia 1 as long as width of the joint. Wings mostly brownish behind, pale in front, costal area unmarked, the brown much broken up, the usual oblique median mark, large pale space below stigma, over base of apical cells, and just before the anastomosis, and extending outward over tips of the first and second subapical cells; few marks in the radial or discal areas, and base of wings is mostly pale; hind wings pale, venation, yellowish. In fore wings the discal cell is longer than its pedicel; in hind wings the discal reaches very much before the fork of median.

Expanse 25 mm.

From Bon Accord, British Columbia, 7th June, (Russell).



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***Limnephilus secludens*, n. sp. (Figs. 17, 27).**

Palpi yellowish, very slender; face dark, with yellow hair; vertex and thorax dark, with yellowish hair and dark bristles; abdomen dull black above, venter pale; legs yellowish, spines black, tibia 1 with very short spines; wings mostly pale, but brownish behind and these faintly broken with pale, a blackish mark on thyridium; hind wings pale, venation yellowish. Fore wings with the discal cell longer than its pedicel; hind wings with discal cell hardly reaching before fork of median. The dark, median pieces of male genitalia are only visible from behind.

Expanse 20 mm.

From Penticton, British Columbia, 9th August (Wallis) and Saskatchewan, July.

***Limnephilus argenteus*, n. sp. (Fig. 13).**

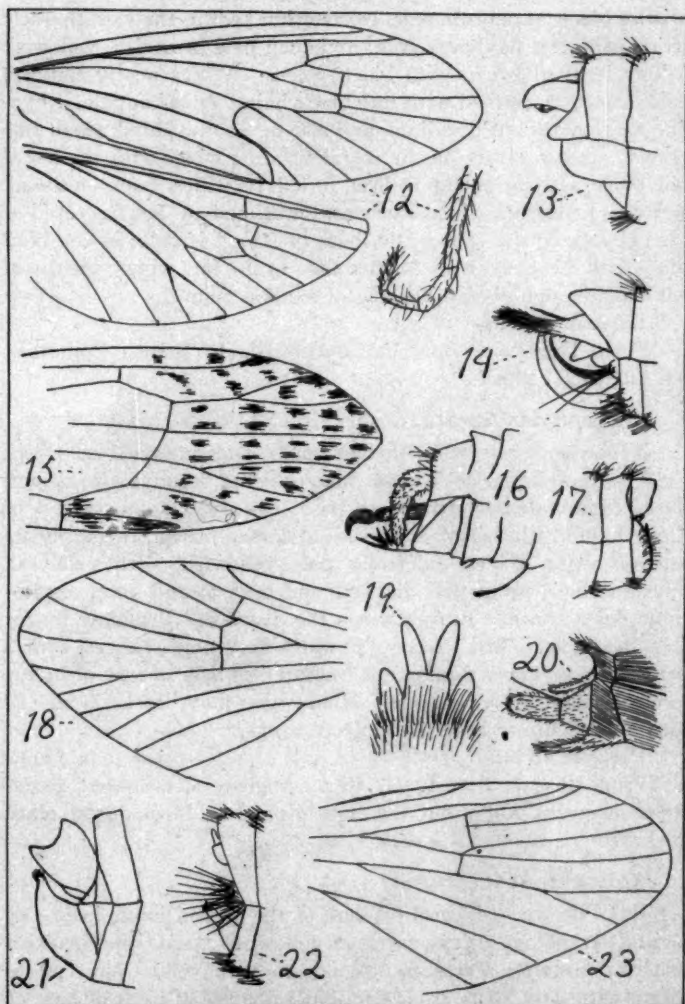
Palpi brownish, face brown with black bristles; vertex dark, pale behind; antennae brownish, faintly annulate, thorax grayish brown, with black bristles and some white hairs near base of wings; abdomen black, tips of segments pale; legs pale yellowish, with black spines, no dark marks on tibiae. Wings brown, densely guttated with silvery marks, large oblique spot near the middle, several near the thyridium and in base of first subapical cell, and near base, but not extreme base, of apical cells with silvery spots, smaller silvery spots all over the wing, costal area with brown marks. Venation as in *L. gravidus*; in hind wings the fourth apical cell is plainly narrower than the second, but not acute, the cross-vein from base of fork 5 up to upper median is much more convex basally, and the lower median more fractured than in *L. gravidus*. The pronotum is longer and more flat above than in that species. The hind wings are excised as in that species, and in *Colpotaulius*, but the shape of fore wings and general appearance more like *Limnephilus*.

Expanse 35 mm.

From Nipigon, Ont., 18th June (Walker).

***Stenophylax hesperus*, n. sp. (Figs. 6, 21).**

Palpi yellowish; antennae dark brown, black on basal joint, paler towards tip; face yellow, with black bristles; vertex yellow,



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with a large median black spot between ocelli and extending back, bristles black; pronotum pale, mesonotum brown, the mesothoracic strips pale, rest of thorax pale; abdomen pale brownish, yellowish below; legs yellowish, with black spines. Wings nearly uniform pale brownish, clothed with fine black hairs; venation pale, a hyaline white mark on thyridium, and also on arculus; hind wings pale grayish, rather darker on the costal tip; fore wings with the discal cell twice as long as the pedicel, fork 1 its width back on discal, fork 3 a little back of anastomosis, lower median not fractured at base of fork 5; the spot in the base of fork 2 is pale; in the hind wings fork 3 extends back farther than in the fore wings; the discal cell extends much before forking of median vein.

Expanse 47 mm.

From Departure Bay, Vancouver Island, British Columbia, 1st August (Walker).

***Stenophylax flavata*, n. sp. (Figs. 32, 33).**

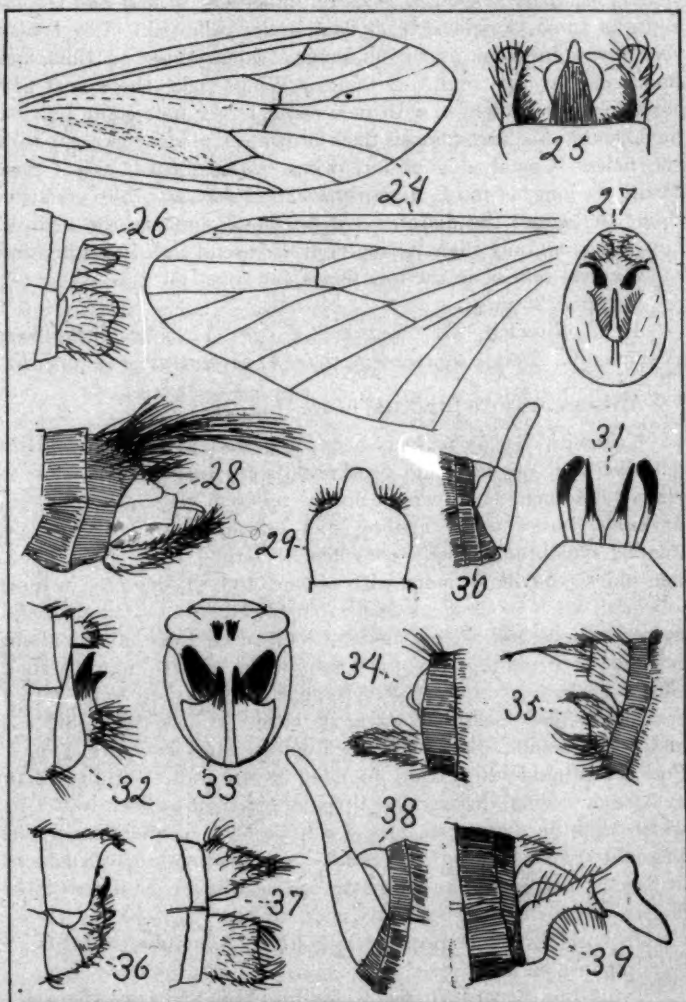
Yellowish with yellowish hair; palpi and antennæ yellowish; ocelli rather large, no ocellar macrochætæ; legs yellow, spines black, tibia 1 densely spined to base, two stout spines at tip of femur 1; hind tibia of male curved; abdomen brown, the segments pale on tips. Wings uniformly pale yellowish, with yellowish veins and hair, tip of thyridial cell, and back to and lower anastomosis dark brown. In fore wings the discal cell is plainly longer than the pedicel, fork 1 nearly its width back on discal cell, fork 3 broad at base, lower median not fractured at base of fork 5; radius barely sinuate before stigma. Hind wings have forks 1 and 3, both more acute at base than in fore wings.

Expanse 40 mm.

From Pisgah Forest, N. Car., August. Resembles *Anisogamus divergens* Walk., but the male has not the black dorsal plate so characteristic of that species.

***Anisogamus infernalis*, n. sp. (Fig. 7).**

Palpi brown, yellowish on base of the second joint; head yellowish, darker on vertex; antennæ yellowish; basal joint blackish beneath; posterior warts and pronotum with yellow hair, mesonotum with dark stripe each side, but tubercles in front of base of wings are pale, with golden hair; abdomen black, but pale on



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venter; legs pale yellowish, black on under side of first and second joints of tarsus I; spines black, and spurs yellowish. Leg I with very few spines, one at tip of femur, two or three on tibia, and small ones at tips of tarsal joints. Wings pale, the apical and posterior part brownish, with pale spots, larger pale spots beyond the anastomosis, anastomosis dark brown, membrane clothed with fine hairs. Costal area of fore wings rather broad, apical part hardly as long as in *A. disjunctus* and *A. costalis*, but venation about the same; the discal cell is hardly as long as the pedicel. Lower median only slightly fractured at base of fork 5; in the hind wings apical cells as in the fore wings.

Expanse 26 mm.

From Pinnacle Mt., Fulton Co., N. Y., 15th September (Alexander). It has shorter legs than *A. disjunctus* or *A. costalis*.

***Anisogamus disjunctus*, n. sp. (Fig. 22).**

Yellowish; darker on head between ocelli and antennæ; mostly yellowish hair on head and prothorax, some black before base of wings; abdomen dark; wings nearly uniform pale yellowish, no markings, but a white hyaline spot on thyridium and also on arculus, membrane faintly roughened, clothed with sparse, fine, pale hair. Maxillary palpi with second and third joints in male subequal, each as long as space between eyes; in female palpi short, last joint not as long as basal joint of antennæ, fourth about one half of fifth, third about three-fourths of fifth joint, second hardly as long as third. Mesothoracic strips quite long, rather broader behind; posterior warts of vertex transversely elliptical and rather small. Legs with black spines and pale spurs, 1, 3, 4. Fore wings moderately long, rounded at tip; radius strongly bent at base of stigma, discal cell a little longer than pedicel, fork 1 its width back on discal cell, fork 3 a little back of anastomosis, its base not very broad, but not acute, lower median much disjointed at base of fork 5, in hind wings the apical cells are similar to those of fore wings, but fork 3 is more acute at base.

In both sexes the cheeks show a little blunt tubercle below.

Expanse 26 mm.

From Bon Accord, British Columbia, May and June (Russell).

(To be continued).

REPORT ON A COLLECTION OF JAPANESE CRANE-FLIES (*TIPULIDÆ*, *DIPTERA*).

(Continued from Vol. XLV., p. 322).

BY CHARLES P. ALEXANDER, ITHACA, N. Y.

Subfamily: *TIPULINÆ*.Tribe: *DOLICHOPEZINI*.Genus: *Nesopeza*, gen. n.

Antennæ 13-segmented, segment 1 cylindrical with a few long hairs; segment 2 oval-cylindrical; segment 3 very long, cylindrical; the succeeding segments gradually shorter, the last very slender. Palpi with the apical segment slender, as long as all of the preceding segments combined. Legs excessively long and slender. Wing-venation as in *Dolichopeza* Curtis (lack of cell 1st M_2 , basal deflection of Cu far before the fork of M, etc.), but the radial sector is very elongate, angulated at origin, almost as long as R_3 beyond the fork, R_s not short and simulating a cross-vein.

Type of the genus: *Dolichopeza gracilis*, de Meij.*Nesopeza gracilis* de Meijere.1911.—*Dolichopeza gracilis* de Meijere; Tijd. voor Ent., vol. 54, p. 60, 61; pl. 4, fig. 46.

One ♀ from Tokyo, Japan; August, 1912. (Vial D.)

This new genus represents one extreme of the *Dolichopeza* group and *Scamboneura* Osten Sacken, the other. In this genus the radial sector is extremely elongated, in *Dolichopeza* Curtis almost transverse and simulating a cross-vein, while in *Scamboneura* the origin of the sector is farther distad than the tip. See my key to the Dolichopezini, Psyche, vol. 19, p. 64. (April, 1912.)

Genus: *Dictenidia* Brullé.

Tribe: CTENOPHORINI.

Dictenidia fasciata Coquillett.1898.—*Dictenidia fasciata* Coquillett; Proc. U. S. Nat. Mus., vol. 21, p. 304, 305.1902.—*Dictenidia fasciata* Kertész; Cat. Dipt., vol. 2, p. 266.

One ♂ from Tokyo, Japan, Aug. 1912 (Vial 39). It agrees very closely with Coquillett's description. The specimen offers the following measurements:

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Length 12 mm.; wing 10.2 mm.; antennæ 5 mm.

Fore leg femur 6.7 mm.; tibia 7.4 mm.

Middle leg femur 7 mm.; tibia 6.4 mm.; tarsus 6.9 mm.

Hind leg femur 8.8 mm.; tibia 10.4 mm.; tarsus 6 mm.

I supply a figure of the wing of this beautiful crane-fly, it never having been figured. (See Plate XII, fig. 8).*

Tribe: TIPULINI.

Genus: **Pachyrhina** Macquart.

Key to the Japanese Pachyrhina.

1. Thoracic markings brown or black, distinct.....2.
 Thoracic markings very pale, ill-defined.....*flavonota*, sp. n.
2. Mesonotal stripes pale brown; tip of wing narrowly and regularly bordered with dark brown; [scutellum and postnotum mostly yellowish; abdominal tergites trivittate].....*palloris* Coq.
 Mesonotal stripes black; tip of wing hyaline or irregularly suffused with darker.....3.
3. Mesonotal stripes very broad, almost concealing the pale ground colour; tip of the wing clouded with darker.....*pullata*, sp. n.
 Mesonotal stripes narrower, so that the yellow ground colour is well defined; tip of the wing clear.....4.
4. Scutellum and postnotum unmarked with darker.....*repanda*, sp. n.
 Scutellum black; postnotum with a dark median vitta.....*virgata* Coq.

Pachyrhina flavonota, sp. n.

Head yellow, shining, without a distinct darker spot; mesonotum orange-yellow with well defined darker stripes.

Male.—Length 12 mm.; wing 10.6 mm.; antennæ 3.8 mm.

Female.—Length 14.6 mm.; wing 14 mm.

Male.—Palpi light brown; frontal prolongation of the head yellow, nasus brown, with a tuft of brown hairs; antennæ, scapal segments yellow, first flagellar segment yellow, on its inner face at three-fourths its length with a wart-like knob, remaining flagellar segments brown, the enlarged bases darker brown, inner face of the

*Plate XII will appear in the next issue.

intermediate flagellar segments not very deeply incised; front, vertex and occiput shining yellow, no distinct mark on the vertex.

Pronotum yellowish; mesonotal præscutum orange-yellow with faint indications of darker stripes; a small brown mark in the notch of the transverse suture; scutum, scutellum and postnotum without distinct marks. Pleura light yellow. Halteres brownish yellow, the knobs yellow. Legs, coxæ and trochanters yellow, femora and tibiæ dull yellow, the tips darker, tarsi brown. Wings subhyaline, the tip broadly but indistinctly suffused with darker; stigma oval, brown; cells C and Sc. a little yellowish. Venation, see pl. XI, fig. 5.

Abdomen with the tergites yellowish, slightly darker medially and laterally; segments 8 and 9 brown; sternites yellowish. The male hypopygium with the 9th tergite from above (plate XI, fig. 6) with the caudal margin four-lobed, the central lobes on either side of the shallow median notch, these lobes provided with numerous black denticulæ; the 9th sternite from below with a broad and deep V-shaped median notch. Outer apical appendages narrow, tapering to a very long point; inner appendage with the usual cephalad prolongation, beneath which is a small, chitinated tooth. (See plate XI, fig. 15.)

Female.—Larger, the abdominal tergites with distinct brown blotches on each segment, these broadest behind, narrowed to a point in the front.

Holotype, ♂, Tokyo, Japan, August, 1912 (Vial K).

Allotype, ♀, Tokyo, Japan, August, 1912 (Vial 42).

***Pachyrhina palloris* Coquillett.**

1898.—*Pachyrhina palloris* Coquillett, Proc. U. S. Nat. Mus., vol. 21, p. 306.

1902.—*P. palloris* Kertész, Cat. Dipt., vol. 2, p. 321.

1910.—*P. palloris* Riedel, Deutsch. Ent. Zeitschr., p. 436.

Two females agreeing rather well with Coquillett's description, but showing the following differences: The median thoracic vitta is bisected from the front by a pale line, making this stripe double; sides of the scutellum brown; the antennæ, broken in the type, may be thus described: four basal segments yellow, remaining

segments with the enlarged basal third dark brownish black, the remainder of each segment dull yellow. The venation is shown in plate XI, figure 2. Vial K. Tokyo, Japan; August, 1912; 2 ♀.

***Pachyrhina pullata*, sp. n.**

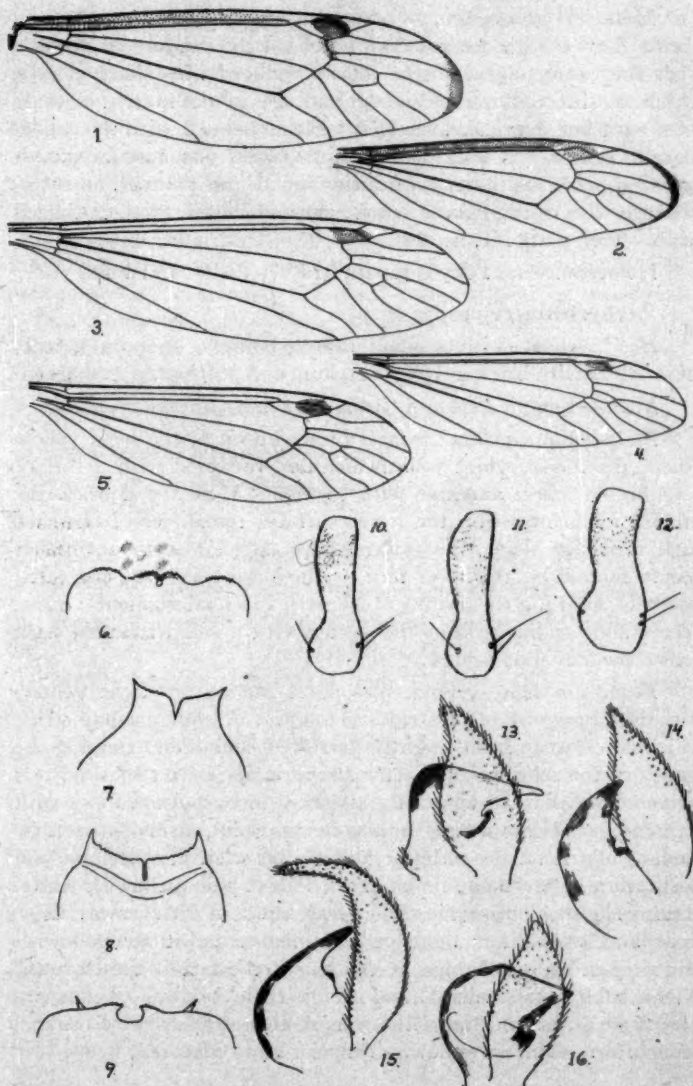
Thoracic dorsum mostly black; wings with the apex brownish.

Male.—Length 17.4 mm.; wing 12.9 mm.; antennæ 4.6 mm. ♀

Male.—Palpi brown, the third segment yellow; frontal prolongation of the head shiny black; antennæ with the first segment brown, paler apically, second segment yellow, third segment pale brown at the base, dark brown at tip, remaining segments dark brownish black. (See plate XI, fig. 12, for outline of the sixth antennal segment); vertex brownish yellow, darkening to the brown on the occiput and genæ.

Pronotum light yellow above; mesonotum dull yellow with three jet black stripes, the median stripe very broad and narrowed behind, the lateral stripes short, broad, straight, the space between these three stripes very narrow and greatly reduced; scutum with the median depression pale in front; behind and on the lobes black; scutellum and postnotum broadly black medially, paler on the lateral margin of the sclerites. Pleura yellow, with dark brownish black blotches as follows: An elongate, vertical mark on the propleura; mesopleura with a large blotch on the ventral portions of the episternum and the sternum; caudal edge of these two sclerites with an elongate vertical blotch extending from the wing-root to mesocoxa, the portion of the postnotum between the base of the wings and the halteres brown; metepimeron brown. Halteres pale, knobs whitish at the tips. Legs, fore coxæ brown, trochanter light yellow, femora yellow basally, browner at tip; other coxæ more yellowish, femora darkening to brown at tip, tibiæ brown, lighter basally; tarsi dark brownish-black. Wings hyaline or nearly so, cells C and Sc. yellowish; stigma brown, distinct; cord margined with brown; apex of wing brownish. Venation as in plate XI, fig. 11.

Abdomen with the first tergite brown, except on the side in front; segments 2 to 5 brown on the caudal half; segment 6 with the caudal half dark brown; segments 7 to 9 dark brown; sternites yellow; caudal half of the 7th to 9th segments dark brown.



JAPANESE CRANE-FLIES

Male.—Hypopygium, with the 9th tergite (pl. XI, fig. 7) from above, narrow with deep median notch on the caudal margin, and with the outer angles of the lobes produced into sharp points, which are directed caudad and laterad, the caudal margin of these lobes with fine denticulæ, 9th sternite from beneath with the caudal margin gently concave, pleural suture very strongly arcuated; apical appendages, outer one rather broad and pointed, inner appendage with a long curved point below which are three chitinated teeth. (See plate XI, fig. 14).

Holotype, ♂. Tokyo, Japan; May 7, 1912. (Vial 30.)

***Pachyrhina repanda*, sp. n.**

Head yellow, with a small rounded brown spot on vertex; mesothorax with black stripes, scutellum and postnotum unmarked.

Male.—Length 12.9 mm.; wing 13.4 mm.; antennæ 5.2 mm.

Male.—Palpi yellow; frontal prolongation of the head yellow except the nasus, which is brownish and provided with a tuft of long brown hairs; antennæ with segments 1 to 3 yellowish, the third a little brown on the lower surface; remainder of antennæ dark brownish black; the intermediate flagellar segments rather deeply incised on the lower face at the basal third (see plate XI, figure 11, showing the outline of the sixth antennal segment); front, vertex and occiput yellow, the vertex with a small rounded dark brown median spot behind.

Pronotum light yellow; mesonotal præscutum light yellow, with dark brownish black stripes as follows: A broad median stripe which is widest in front, slightly narrowed behind and running the length of the sclerite; a shorter lateral stripe on either side, this stripe curved laterad before the pseudosuture; scutum, lobes with a prominent oblique stripe running across them; a small triangular median blotch on the anterior half of the sclerite; scutellum and postnotum light yellow, unmarked. Pleura pale yellowish white. Halteres light coloured, the knob a little suffused with brown. Legs, coxæ and trochanters light yellow, femora and tibiæ yellowish brown, passing into brown at the tip of the latter; tarsi brown. Wings subhyaline, cells C and Sc. a little brighter, yellowish; stigma small, brown, tip of the wing a little suffused with darker; veins brown, vein Sc. yellow. Venation as in plate XI, figure 3.

Abdomen, tergites yellow with an indistinct light brown blotch in the middle of each sclerite; lateral sutures darker; sternites yellow; segments 7 to 9 dark brown. Male hypopygium with the 9th tergite (see plate XI, fig. 8) from above with the caudal margin concave, with a deep, parallel-sided, median notch, the lateral angles produced into points which are directed caudad the caudal margin with small, black denticulae and points; 9th sternite from below with the caudal margin about straight with a rounded median protuberence. Apical appendages, the outer fleshy lobe rather broad, the point moderately long and rather obtuse; the inner appendage is strongly chitinized, rounded-oval, on the cephalic face produced into a long point which is directed forward; below this point, very strongly chitinized and deeply incised. (See plate XI, fig. 16.)

Holotype, ♂, Tokyo, Japan; August, 1912. (Vial 43.)

***Pachyrhina virgata* Coquillett.**

1898.—*Pachyrhina virgata* Coquillett, Proc. U. S. Nat. Mus., vol. 21, p. 306.

1902.—*P. virgata* Kertész, Cat. Dipt., vol. 2, p. 325.

1910.—*P. virgata* Riedel, Deutsch. Ent. Zeitschr., p. 436.

Several specimens of this interesting species were included in the collection.

Male.—Length 10.8—11.8 mm.; wing 10.2—12.4 mm.; antennae 4.6—4.9 mm.

Female.—Length 14.4 mm.; wing 13 mm.

I give a figure of the sixth antennal segment in plate XI, figure 10, and of the wing-venation in plate XI, figure 4. The male hypopygium may be described as follows: The 9th tergite from above (plate XI, figure 9) with the caudal margin having a broad rounded median notch into which the tips of the apical pleural appendages fit, the inner edge of the adjacent lobe produced into chitinized lobules which are provided with denticulae; each lobule with a sharp chitinized point on its caudal margin, these points directed caudad. In a small ♂ (Vial 46) the median notch is not so rounded, more oval, the sharp caudal points are longer. Apical appendages, the outer fleshy lobe rather broad and pointed, inner lobe with a

long, cephalad-directed point which is provided with a few hairs on its lower face, with a deep notch beneath its base and a strongly chitinated protuberance. (See plate XI, fig. 13).

Vial 22; Tokyo, Japan; April 26, 1912; 1 ♂, 1 ♀.

Vial 35; Tokyo, Japan; May 7, 1912; 1 ♀.

Vial 43; Tokyo, Japan; Aug. 1912; 2 ♂.

Vial 44; Tokyo, Japan; Aug. 1912; 1 ♀.

Vial 46; Tokyo, Japan; Aug. 1912; 2 ♂.

Vial K; Tokyo, Japan; Aug. 1912; 1 ♀.

(To be continued.)

THE PRESENCE OF RING-JOINTS IN AUSTRALIAN *SCELIONIDÆ*.

BY ALAN P. DODD, NELSON, N. Q., AUSTRALIA.

Quite recently while examining the antennæ of a Scelionid, *Gryonella reticulata* Dodd, I was somewhat surprised to find that two small ring-joints were present. As ring-joints have not been recorded in this family, I had never searched for them, and it was only accidentally that their presence in this species was noticed. This discovery caused me to examine the antennæ of numerous Scelionids in my collection. I found that in some cases there were obviously no ring-joints present; in others there appeared to be minute ring-joints, but I could not make sure of the fact, while in a few cases the ring-joints were distinct, though small. The following species possessed obvious ring-joints: Subfamily *Teleasina*, *Gryonella reticulata* Dodd; Subfamily *Balina*, *Acolomorpha minuta* Dodd; Subfamily *Scelionina*, *Hadronotus nigriceps* Dodd, *Opisthacantha giraulti* Dodd, *Sceliacanthella paroipennis* Dodd, *Leptoteleia aurea* Dodd, *Baryconus exsertus* Dodd, *B. longipennis* Dodd, and *B. trispinosus* Dodd.

The species, *Opisthacantha giraulti*, possessed apparently one ring-joint, but under high-power magnification there appeared to be three excessively thin ring-joints. *Gryonella reticulata* had two ring-joints, while the other species mentioned possessed but one each. This discovery is of considerable interest.

NEW AND LITTLE KNOWN SPECIES OF APHIDIDÆ.

BY JOHN J. DAVIS, BUREAU OF ENTOMOLOGY, WASHINGTON, D. C.

(Continued from Page 134.)

Rhopalosiphum howardii (Wilson).

This species has been collected by us from widely separated localities, and in all cases we have found it on the flower heads of the host plants. Mr. H. F. Wilson first described this species as *Amphorophora howardii* from the heads of *Panicularia nervata* at Batesburg. Mr. Geo. G. Ainslie found it on timothy heads, June 28, 1908, at Biltmore, N.C., Mr. R.A. Vickery collected it on *Elymus virginicus*, June 19, 1909, at Salisbury, N.C., Mr. C. N. Ainslie found it on heads of *Elymus*, August 11, 1911, at Salt Lake City, Utah; and the writer has collected it on the following plants and at the following localities: La Fayette, Ind., on heads of *Elymus canadensis*, orchard grass (*Dactylis glomerata*), and wheat, from July to October, inclusive; at Bedford, Ind., on *Elymus canadensis* and *E. striatus*, August 13, 1911; at Urbana, Ill., on *E. canadensis*, July 27, 1912; Lancaster, Wis., on *E. canadensis*, and cultivated barley, July 11, 1912; at Farley, Iowa, on *E. canadensis*, August 30, 1912; at Winner and Elk Point, S. Dak., on *E. canadensis*, September 2 and 5, respectively, 1912; and at Beaver Dam, Wis., on *E. canadensis*, September 11, 1912. During August, September, and October, the winged males were not uncommon, and these took flight within a few days after becoming winged. Although careful search was made, we were unable to find oviparous females. It appears from our present meagre data that the winged males and winged viviparous females migrate to an unknown host in the fall of the year, where the oviparous females are produced, as is also probably the case with *Myzus lycopersici* (Clarke).

Wingless viviparous females.

(Pl. VII, fig. 34.)

Entire body nearest to cadmium yellow as given in Smith's colour chart, but not so bright, the colour varying to brownish cadmium yellow; head and thorax paler, with a slight greenish tint. Antennæ blackish, excepting segments I, II, and entire base of III, which are dusky greenish (in recently matured individuals III, basal three-fourths of IV, and extreme base of V are brownish);

May, 1914.

segments III and filament of VI subequal; total length very little more than half the body length and not reaching to base of cornicles; segment III as well as IV lacking sensoria, the usual distal ones being present on segments V and base of VI. Eyes blackish, ocelli absent. Legs with femora pale brown, the tibiae and tarsi black. Cornicles black and shaped as in the winged female. Style pale yellowish to brownish yellow, otherwise as in winged female.

Measurements from 8 specimens in balsam as follows: Length of body, not including cauda, 1.65 to 2.05 mm., average 1.80 mm.; length to tip of cauda 1.78 to 2.16 mm., average 1.93 mm.; width of body 0.97 to 1.08 mm., average 1.00 mm.; length of cornicle 0.43 to 0.49 mm., average 0.45 mm.; length of cauda 0.16 to 0.19 mm., average 0.18 mm. Antennal measurements as follows:

Locality, date, etc.	I. mm.	II. mm.	III. mm.	IV. mm.	V. mm.	VI. (base) mm.	VI. (fil.) mm.	Total mm.
La Fayette, Ind., Wheat, July 17, 1912.....	.....	.....	0.313	0.191	0.174	0.113	0.313	.....
Urbana, Ill., Elymus, July 27, 1912.....	.....	.....	.322	.157	.157	.104	.348	.....
Urbana, Ill., Elymus, July 27, 1912.....	.....	.....	.296	.157	.148	.104	.348	.....
La Fayette, Ind., Elymus, Aug. 14, 1911.....	0.087	0.061	.330	.209	.191	.113	.330	1.321
La Fayette, Ind., Elymus, Aug. 14, 1911.....	.087	.061	.322	.217	.191	.113	.330	1.321
La Fayette, Ind., Elymus, Sept. 4, 1911.....	.087	.061	.348	.226	.182	.104	.348	1.356
La Fayette, Ind., Elymus, Sept. 4, 1911.....	.087	.061	.356	.226	.182	.....	.....	.....
Elk Point, S. Dak., Elymus, Sept. 5, 1912.....	.087	.069	.417	.278	.243	.122	.400	1.616
Elk Point, S. Dak., Elymus, Sept. 5, 1912.....	.087	.069	.417	.296	.243	.122	.417	1.651
Winner, S. Dak., Elymus, Sept. 2, 1912.....	.....	.....	.313	.252	.209	.104	.348	.....
Winner, S. Dak., Elymus, Sept. 2, 1912.....	.087	.061	.348	.235	.226	.104	.333	1.444
Lancaster, Wis., Barley, July 11, 1912.....	.....	.....	.330	.209	.174	.122	.348	.....
Lancaster, Wis., Barley, July 11, 1912.....	.....	.....	.339	.191	.165	.104	.330	.....
Beaver Dam, Wis., Elymus, Sept. 11, 1912.....	.087	.069	.556	.....	.217	.122	.408	1.450
Beaver Dam, Wis., Elymus, Sept. 11, 1912.....	.087	.069	.400	.287	.226	.113	.400	1.542

Winged viviparous female.

(Pl. VII, figs. 35-39).

Head dark brown. Antennæ black, excepting basal half of I and ring at extreme base of III, which parts are pale, and sometimes all of I and II are pale dusky; segment VII the longest; not reaching to tip of body; 2 to 10 circular sensoria in a row, usually near base, on segment III, and the usual distal ones on V and base of VI. Eyes reddish black, ocelli black. Beak barely reaching to coxæ of the second pair of legs. Thoracic plates shining dark brown. Wing veins blackish and conspicuous, the venation as illustrated. Legs with femora pale, excepting the hind pair, which are dusky to black; the tibiæ and tarsi black. Abdomen usually brownish yellow, but sometimes with a distinct pale green tint, and bearing three dusky spots on each side anterior to the cornicles; also the dorsum of each segment with a more or less distinct dusky transverse band. Cornicles black, a little longer than segment IV of the antennæ, and reaching about to tip of cauda, clavate in shape. Cauda pale greenish yellow, semi-ensiform and sparsely hairy.

Measurements, taken from 10 specimens mounted in balsam, as follows: Length of body, not including cauda, 1.35 to 1.74 mm., average 1.51 mm.; length of body to tip of cauda 1.47 to 1.90 mm., average 1.64 mm.; width of body 0.55 to 0.74 mm., average 0.65 mm.; length of wing 2.40 to 2.94 mm., average 2.67 mm.; width of wing 0.85 to 1.08 mm., average 0.93 mm.; cornicles 0.33 to 0.38 mm., average 0.35 mm.; cauda 0.156 to 0.191 mm., average 0.173 mm. Antennal measurements as follows:

Locality, date, etc.	I.	II.	III.	IV.	V.	VI. (base)	VI. (fil.)	Total	No. spec. on III.
Salisbury, N. C. Elymus, R. A. Vickery.....	0.080	0.060	0.383	0.278	0.226	0.130	0.556	1.722	4
Salisbury, N. C., Elymus, R. A. Vickery.....	.080	.060	.383	.261	.243	.130	.556	1.713	2
Salisbury, N. C., Elymus, R. A. Vickery.....	.....	.....	.417	.313	.304	.139	.609	.....	5
Salisbury, N. C., Elymus, R. A. Vickery.....	.....	.....	.417	.330	.304	.156	.574	.....	5
La Fayette, Ind., Dactylis, July 17, 1912.....	.090	.070	.470	.348	.278	.130	.478	1.873	8
La Fayette, Ind., wheat, July 17, 1912.....	.....	.....	.400	.296	.226	.130	.461	.....	9

Locality, date, etc.	I.	II.	III.	IV.	V.	VI. (base)	VI. (fil.)	Total	No. sens. on III.
La Fayette, Ind., wheat, July 17, 1912.....	.090	.060	.408	.278	.226	.139	.470	1.671	10
Lancaster, Wis., barley, July 10, 1912.....	....	....	.435	.296	.243	....	....	....	5
Lancaster, Wis., barley, July 10, 1912.....	....	....	.426	.313	.261	.139	.556	....	....
Urbana, Ill., Elymus, July 27, 1912.....	.080	.070	.435	.330	.261	.148	.478	1.802	7
Urbana, Ill., Elymus, July 27, 1912.....	....	....	.417	.348	.278	.139	.522	....	7
Bedford, Ind., Elymus, Aug. 13, 1911.....	.080	.060	.365	.269	.235	.122	.487	1.618	4
La Fayette, Ind., Elymus, Sept. 6, 1911.....	.080	.060	.417	.296	.243	.122	.435	1.653	3
La Fayette, Ind., Elymus, Sept. 6, 1911.....	.080	.060	.391	.296	.252	.122	.452	1.653	3
Elk Point, S. Dak., Elymus, Sept. 5, 1912.....	.080	.060	.470	.313	.261	.139	.522	1.845	7
Elk Point, S. Dak., Elymus, Sept. 5, 1912.....	.090	.070	.487	.330	.252	....	....	....	6
La Fayette, Ind., wheat, July 17, 1912.....	....	....	.435	.296	.243	.139	.522	....	9
La Fayette, Ind., wheat, July 17, 1912.....	.090	.060	.435	.313	.252	.139	.539	1.818	8

Winged male.

(Pl. VII, fig. 40.)

Head blackish. Antennæ black; segment III longest, reaching a little beyond tip of body; segment III with 39 to 55 irregularly placed, moderately tuberculate, circular sensoria, segment IV with from 18 to 23, segment V with from 6 to 9, not including the usual distal one, and segment VI (base) with the usual distal sensoria. Thorax blackish. Wings as in the viviparous form. Legs blackish, excepting the base of femora. Abdomen dull green, with black transverse bands on the first three abdominal segments, and three rather large black spots on each side anterior to the cornicles; also a few scattered black markings on the abdomen, evidently traces of transverse bands. Cornicles black, clavate, reaching about to tip of cauda. Cauda concolorous with abdomen and conical in shape.

Average measurements from 3 specimens mounted in balsam, as follows: Length of body, not including cauda, 1.68 mm.; length to tip of cauda 1.79 mm.; width 0.83 mm.; length of wing 3.12 mm.,

width 1.16 mm.; cornicles 0.77 mm.; cauda 0.31 mm. Antennal measurements as follows:

	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
La Fayette, Ind., Elymus, Oct. 10, 1911.....	0.087	0.070	0.504	0.400	0.313	0.130	0.678	2.182
La Fayette, Ind., Elymus, Oct. 10, 1911.....	.087	.070	.487	.383	.313	.130	.....	.....
La Fayette, Ind., Elymus, Oct. 10, 1911.....	.080	.070	.504	.400	.304	.130	.652	2.149
La Fayette, Ind., Elymus, Oct. 10, 1911.....	.087	.070	.504	.383	.322	.130	.661	2.157
Farley, Iowa, Elymus, Aug. 30, 1912.....	.087	.070	.539	.383	.304	.166	.539	2.078
Farley, Iowa, Elymus, Aug. 30, 1912.....	.....	.....	.539	.383	.330	.139	.591	.....

***Eulachnus rileyi* (Williams) ***

This species is very closely related to *Eulachnus agilis* Kalt., both in form and in its habits, but differs from that species as described by G. Del Guercio by lacking sensoria on antennal segment III of the winged viviparous female. Del Guercio does not refer to the sensoria in his description, but in his figure on Plate XVII (fig. 227)* he shows the antennæ of the winged viviparous female of *E. agilis* to bear 8 sensoria on segment III, 3 sensoria segment IV, 2 sensoria on segment V, and the usual ones on segment VI.

Wingless viviparous female.

(Pl. VII, fig. 41.)

Head dusky brown; the prothorax likewise dusky, with a paler median dorsal line; remainder of body varying in colour from orange brown to nearly black or greenish black, usually the former; a longitudinal row of black dots on each side of the dorsal median and another row of similar dots lateral of this, each dot bearing a long spine-like hair; in life the body is usually covered with a pulverulence, giving the insect a hoary appearance and usually obscuring all markings. Antennæ, head, legs, and cauda, as well as the body, bearing numerous conspicuous, long, black, spine-like hairs. Antennæ dark brownish to blackish, excepting basal halves of IV and V, and extreme base of VI, which are paler; segment III longest; total length about one-half that of the body; segment IV

*This species has not been positively identified, since the type specimens are not available. The male of our species agrees well with the winged form as described by Williams for *L. rileyi* and the identification as here recorded is probably correct.

bearing a small distal sensorium, segment V a large distal sensorium, and segment VI one larger and two or three smaller ones near by. Eyes black. The hind pair of legs entirely blackish, except the basal ends of femora, which are paler; the two fore pairs of legs brownish, excepting tarsi, which are black. Cornicles represented by a black circle. Cauda broadly rounded and typical of the genus.

Average measurements for 6 specimens in balsam as follows: Length of body 2.13 mm., width 0.66 mm.; length of middle tibia 0.81 mm.; hind tibia 1.43 mm.; length of first tarsal segment of hind tibia 0.113 mm., of second tarsal segment 0.217 mm. Antennal lengths as follows:

Locality, date, etc.	I. mm.	II. mm.	III. mm.	IV. mm.	V. mm.	VI. mm.	Total mm.
St. Louis, Mo., July 25, 1911.	0.078	0.087	0.400	0.209	0.243	0.191	1.208
St. Louis, Mo., July 25, 1911. . . . .	.087	.087	.391	.209	.243	.191	1.208
Chicago, Ill., July 20, 1910. . . . .	.087	.087	.400	.243	.252	.191	1.260
Chicago, Ill., July 20, 1910. . . . .	.087	.087	.400	.226	.261	.191	1.252
Chicago, Ill., July 20, 1910. . . . .	.087	.087	.374	.226	.269	.200	1.243
Chicago, Ill., July 20, 1910. . . . .	.087	.087	.383	.209	.269	.191	1.226
Chicago, Ill., July 20, 1910. . . . .	.087	.087	.356	.226	.243	.209	1.208
Chicago, Ill., July 20, 1910. . . . .	.087	.087	.356	.217	.252	.200	1.199
Chicago, Ill., July 20, 1910. . . . .	.078	.087	.356	.235	.269	.191	1.216
Chicago, Ill., July 20, 1910. . . . .	.078	.087	.374	.243	.269	.182	1.233
St. Louis, Mo., Oct. 6, 1910, J. T. Monell. . . . .	.087	.087	.452	.269	.278	.217	1.390

Winged viviparous female.

(Pl. VII, figs. 42-46.)

Entire body covered with a conspicuous white flocculence, beneath which the head and thorax are of a brownish colour and the abdomen a greenish brown to ochreous brown, more often the latter; abdomen with a row of inconspicuous setiferous dots, one on each side of the median line. Legs, antennæ and front of head bearing prominent spine-like hairs as in the wingless form; the cauda and tip of abdomen bearing many rather long hairs. Antennæ blackish, excepting basal half of III, which is pale brown; a little more than half the body length; segment III longest; sensoria as in the wingless forms. Eyes black. Hind legs blackish, excepting basal ends of femora; two fore pairs of legs similarly coloured

excepting tibiae, which are pale at extremities. Wings as in illustration, the media usually one-branched, although this character is variable, Mr. Monell has collected specimens of this species in St. Louis which had the media unbranched, and he also collected one individual with a bifurcate media. Regarding this variable venation Mr. Monell wrote Dr. H. Schouteden, who replied under date of April 23, 1905, as follows: "A Lachnus with cubital vein unforked is quite unknown to me, but there are some species with only one fork (*L. agilis*)."

Cornicles and cauda as in wingless form.

Average measurements from 3 specimens in balsam as follows: Length of body 2 mm., width 0.50 mm.; length of wing 2.2 mm., width 0.70 mm.; length of middle tibia 0.79 mm., of hind tibia 1.62 mm.; length of first tarsal segment 0.113 mm., of second tarsal segment 0.209 mm.

Antennal measurements as follows:

Locality and Date	I. mm.	II. mm.	III. mm.	IV. mm.	V. mm.	VI. mm.	Total mm.
St. Louis, Mo., July 25, 1911.....	0.070	0.078	0.435	0.235	0.243	0.191	1.252
St. Louis, Mo., July 25, 1911.....	.078	.078	.443	.243	.261	.191	1.294
St. Louis, Mo., July 25, 1911.....	.078	.087	.426	.261	.287	.209	1.348
St. Louis, Mo., July 25, 1911.....	.078	.087	.469	.269	.269	.209	1.381
Chicago, Ill., July, 20 1910.....	.078	.087	.490	.243	.261	.191	1.260

Winged Male.

(Pl. VII, fig. 47).

Head and thorax black; abdomen pale brownish, with a dull orange tint, and the entire body covered with a white pulverulence. Antennae black, reaching nearly to tip of body; segment III longest; segment III with 60 to 84 faintly tuberculate, circular sensoria, IV with 22 to 41, V with 10 to 29, not including the usual large distal sensorium, and segment VI with 3 to 5, not including the usual large sensorium. Eyes black. Wings as in the viviparous female. Legs black, excepting the pale extreme bases of femora and the brownish basal halves of tibiae. Cornicles and cauda as in other forms, the anal plate dusky.

Average measurements from six individuals in balsam as follows: Length of body 1.59 mm., width 0.47 mm.; length of wing 2.61 mm., width 0.83 mm. Antennal measurements as follows:

Locality and Date	Measurements						No. of sensoria			
	I mm.	II mm.	III mm.	IV mm.	V mm.	VI mm.	Total mm.	III	IV	V* VI*
St. Louis, Mo., Oct. 1, 1910.....	0.078	0.087	0.617	0.382	0.417	0.243	1.824	75	25	17 3
St. Louis, Mo., Oct. 1, 1910.....	0.078	0.087	0.635	0.400	0.417	0.261	1.878	81	33	18 5
St. Louis, Mo., Oct. 1, 1910.....	0.078	0.087	0.522	0.304	0.313	0.217	1.521	72	24	19 3
St. Louis, Mo., Oct. 1, 1910.....	0.078	0.087	0.548	0.313	0.313	.....	.....	65	22	20 ..
Morgan Park, Ill., Sept. 22, 1908.....	0.078	0.087	0.582	0.365	0.301	0.261	1.704	83	28	20 4
Morgan Park, Ill., Sept. 22, 1908.....	0.078	0.087	0.565	0.400	0.400	0.252	1.782	..	..	.. ..
St. Louis, Oct. 6, 1910 J. T. Monell.....	0.078	0.087	0.501	0.374	0.382	0.226	1.738	72	32	17 4
St. Louis, Mo., Oct. 6, 1910, J. T. Monell.....	0.087	0.087	0.609	0.365	0.374	0.235	1.757	83	31	16 5
St. Louis, Mo., Oct. 24, 1909.....	0.078	0.087	0.556	0.356	0.348	0.243	1.668	72	30	10 4
St. Louis, Mo., Oct. 24, 1909.....	0.078	0.087	0.574	0.348	0.339	0.235	1.661	60	27	13 ..
La Fayette, Ind., Oct. 23, 1912.....	0.087	0.087	0.661	0.382	0.452	0.261	1.930	83	34	29 4
La Fayette, Ind., Oct. 23, 1912.....	0.087	0.087	0.661	0.391	0.435	0.278	1.930	84	41	10 4

*Not including the large sensorium.

Wingless oviparous female.

(Pl. VII, fig. 48.).

Body ochreous brown and covered with many small blackish dots, each giving rise to a spinelike hair; head and thorax with dusky longitudinal bands on each side of the median line; the entire body covered with a fine pulverulence. Antennæ dusky to blackish, segment IV being slightly paler at base; relative length of segments about as in other forms; less than half the body length; sensoria as in wingless viviparous female. Eyes black. Legs blackish, excepting bases of femora, which are paler; hind tibiae swollen and bearing about 65 circular sensoria. (An occasional oviparous female has been observed which bore no visible sensoria on hind tibiae, although the latter are always swollen.) Anal plate dusky.

Average measurements from 5 specimens in balsam as follows: Length of body 2.55 mm., width 0.85 mm. Antennal measurements as follows:

Locality and Date	I. mm.	II. mm.	III. mm.	IV. mm.	V. mm.	VI. mm.	Total mm.
Morgan Park, Ill., Sept. 22, 1908...	.087	0.096	0.417	0.261	0.296	0.226	1.383
Morgan Park, Ill., Sept. 22, 1908...	.087	.087	.417	.261	.278	.209	1.339
Chicago, Ill., Oct. 15, 1909.....	.087	.087	.408	.261	.287	.199	1.329
Chicago, Ill., Oct. 15, 1909.....	.087	.087	.426	.252	.296	.217	1.365
St. Louis, Mo., Oct. 24, 1909.....	.087	.096	.417	.252	.269	.209	1.330
St. Louis, Mo., Oct. 24, 1909.....	.087	.087	.400	.261	.261	.217	1.313
St. Louis, Mo., Oct. 24, 1909.....	.087	.096	.426	.226	.261	.199	1.295
St. Louis, Mo., Oct. 24, 1909.....	.087	.087	.400	.209	.261	.199	1.243
La Fayette, Ind., Oct. 23, 1912....	.087	.096	.435	.252	.252	.199	1.321
La Fayette, Ind., Oct. 23, 1912....	.087	.087	.452	.234	.243	.217	1.320

Egg.—(Fig. 18.)

When first laid, the egg is a pale yellowish brown, later changing to ochreous brown, and finally to jet black. It measures 0.65 by 0.30 mm. This insect lives upon the pine throughout the summer, and the winter eggs are deposited on the blackish leaf sheath at base of leaves of the same plant.

Outside of Nebraska, the type locality of *Eulachnus rileyi*, this species has been reported from Albany, N. Y., under the name *Lachnus agilis* Kalt., by Prof. C. P. Gillette.* The writer has collected it on the Austrian or black pine (*Pinus austriaca*) at Chicago, Morgan Park, and Urbana, Ill.; Independence, Iowa; La Fayette, Ind., and, in company with Mr. Monell, at St. Louis, Mo. Mr. Monell has specimens in his cabinet collected by Mr. Theo. Pergande in 1882 and 1885 at Washington, D. C., on the Jersey or scrub pine (*Pinus inops*), and he has himself collected it at various times



Fig. 18

since 1905 at St. Louis, Mo., on *Pinus austriaca*.

(To be continued.)

*Plant louse notes, Family Aphididae. Journ. Econ. Ent., vol 2, No. 6, pp. 385-388, 1909.

NOTES ON *RHABDOCNEMIS OBSCURUS* BOISD. IN AUSTRALIA.*

BY A. A. GIRAULT, NELSON, N.Q., AUSTRALIA.

During July, 1912, this species was reported to be injuring sugar cane at Innisfail (Darradgee, Goondi and Mundoo), North Queensland. Upon visiting the area during the last week of the month, the reports were found to be true and active measures were being taken by the farmers to combat the insect. Injured cane was first noticed on the trucks at the Goondi Mill, where about one or two per cent of the bottom ends of the cut cane were observed to bear borer channels. Later, after exploring rapidly the whole area, the insect was found to be most common at Darradgee, common at Goondi, but none were found at Mundoo nor East Innisfail. The farmers were using baits made of halved pieces of cane, the inner side of each half stick sometimes smeared with molasses and a half a dozen or so laid face down upon the ground in a row upon a small, clean area. The baits were placed only around one or two edges of a field; a large number of them were examined during the week, with the result that no beetles were found as a general rule with the exception of the worst fields, where on the average a dozen were taken from each trap (day: these fields had been trapped and collected for several weeks previously). Badila was the variety infested, since I saw but little injury to others (mostly Singapore); the former is softer, having less fibre. Exploration of cane fields—in the trash left after cutting, under logs, around the edges of cane fields, in nearby jungles, on banana trees and so forth—resulted in finding the beetle only in the living cane plants, where they were hiding (daytime) under the sheaths of the lowest *green* leaves upon which they feed by gouging out short, longitudinal channels from the inner surface. Sometimes they were hiding under the lower (dead) leaf-sheaths, and, as stated, under the traps. Rarely, a beetle was found on the ground or out of the fields entirely. None were seen at lights at night. They were sluggish at all times and none were observed flying (day); when disturbed they would generally assume a feigning attitude, remaining inert. The edges of the field, apparently, were most

* Contribution No. 8, Ent. Laboratory, Bureau of Sugar Experiment Stations, Bundaburg, Q.
May, 1914

infested, but sometimes the insect was distributed over an entire field.

There were no external indications of the presence of the borer in the fields, excepting that infested plants were weakened somewhat, and therefore very likely to be broken off by the wind; weakened and diseased plants were found to be infested more frequently than others. In canes which had been broken off by a cyclone, several months previously, when infested, there was sometimes a minute discoloured spot indicating the position of a large larva; these canes were infested near their tops and were only about three feet high and bare of leaves.

All stages of development were present. As a rule, only one or two of the beetles were found hiding in the same place; once four were found together and quite frequently pairs, but these were not mating, though in the mating position.

The farmers in the Goondi area had combined tolerably well and were using, as stated, the cane baits recommended by the Hawaiian entomologists; at the time, which was just before harvest, it seemed to me that one thorough search of the worst fields by hand, collecting the beetles and then, after harvest, burning the trash, would destroy the majority of those remaining, while the larvæ in the cane would be destroyed by the milling process. Mr. Robert Davis, of Darradgee, whom I quote later, brought to me some small pieces of infested cane taken from the remains of the trash on his field which had just been burnt in my presence. From these pieces were obtained three larvæ, two pupæ and three adults, and all proved to be dead except one pupa; later, the latter died; these specimens were taken from the interior of the pieces of infested cane, the pupæ and adults from cocoons. They appeared to have been steamed to death. From Mr. Davis I received the following interesting account:

"Notes in Connection with Cane Borer Pest.

"I first discovered Borer in or about April, 1912, in two shoots of cane while cutting cane for plants, after the field had been broken down by a recent cyclone. I made several enquiries about them from older farmers and was told that they were harmless, as they had been present on the (Johnstone) river for years past.

From April to the end of June I saw very few traces of them, owing to the heavy rainfall washing the ground. About the end of June they were found in many places, and because of enquiries I started to use baits composed of short pieces of cane split down the centre and laid flat on the headlands at about one quarter of a chain apart. In the meantime, I cleaned up all broken cane and cane tops from places where trees had fallen over on to the field, for in such places I found that the beetle bred more there; they were much worse in broken cane than in that standing. Cane broken and lying on the ground to rot is infested far worse than standing cane. The borer is also fond of hiding behind top leaves of standing cane and feeding on inside of leaf. During my clean-up I should say that we caught about two quarts of beetles and grubs; the second day caught some three quarts; the third day only a quart; the daily catch for the next week was about fifty borers a day. Since then the catch has been lessening, some days very few being caught. I also noticed that the damage was very much less on the headlands.

I have found old borers in last year's cane, left on the ground; also in cane that had been burnt last year. The borer works in the centre of the field as well as outside; it prefers *Badila* to any other. I find fresh, sweet cane quite as good for baits as sour cane; molasses darkens the bait and makes it difficult to see the captured beetles. I am quite sure that the borer will not be very plentiful, unless the cane is broken. The eggs laid in cane last April are now coming out in beetle form (last week of July). From June to last of July, I estimate that I have caught about 12,000 beetles and grubs, my outlay, not counting my own and boy's labor, being some £14."

During the time which I spent in the fields, a small quantity of the adults were collected and sent alive to the laboratory at Nelson (Cairns), N. Q., where they were kept temporarily under a wire cage containing pieces of cane. They fed upon the ends of these pieces; inserting their rostra into the soft pith. They were kept successfully in this cage until August 12, 1912, when they were taken out and counted; there were sixty-three males, fifty-four females—all collected at random in the Innisfail district from cane plants. From the ends of the pieces of cane upon which they

had been feeding for several weeks and which were now fermenting and dying, were recovered six eggs which died when exposed to the atmosphere.

Thirty-three random beetles were taken and confined singly in long glass vials plugged with cotton (vial 4 inches long by $\frac{3}{4}$ -inch diameter); they were not fed, and spent most of their energy in trying to escape; they died as follows: After one day, three males; two days, 6 males, 5 females; after three days, 8 males, 5 females; on the fourth day, 4 males, 2 females. They thus seemed to require a constant supply of food.

Ten random pairs were placed on a cane plant (leafless) under a high Tower breeding cage; all were dead after three weeks, as was also the cane plant.

On October 1, 1912, a single young larva was placed within a wound made in the top side of a strip of cane which had rooted in a box of earth; this larva hatched from eggs deposited between September 19-30, 1912. It developed; on November 27, or after nearly two months, the cane was cut off just below the spot where the young larva had entered, exposing a cylindrical channel which was five inches long, traversing four nodes. The grub was found at the end of this channel, nearly full grown. On December 20 the plant was examined again; the grub had gone four inches farther down and then returned, constructing a cocoon at about the place where it had been found in November. The cocoon contained a pupa which was accidentally injured. The plant was dead. The period of development in this case was about three months, probably longer than natural because of the unhealthy plant in which the grub developed. When placed into the plant, the young grub was about a week old or less.

Eleven glass jars were taken on August 12 and partly filled with about an inch of moist, sifted soil upon which was placed a node of matured cane; into each of these was introduced a male and female beetle of about equal size. The jars were then covered with cheese cloth. Four similar jars received single females taken at random and a fifth jar, five females. From time to time, the pieces of cane were removed from these jars, examined and a fresh piece added. The removal became necessary in most cases because of moulds developing on the cane. The beetles fed from the pith

at each end and eggs were laid into the ends quite frequently. The following short tables summarize:

TABLE I.—SUMMARY OF ELEVEN PAIRS KEPT IN CONFINEMENT FROM AUGUST 12, 1912.

No.	Dates of Finding	No. Eggs	No. Larvæ	Total Progeny	Death		Length of life — Days	
					Male	Female	Male	Female
1	Aug. 19, 24; Sep. 19; Oct. 2, 10	11	4	15		Oct. 20	...	69
2	Oct. 11; Nov. 15, 30; Dec. 7, 10	1	18	19	Nov. 23	Dec. 10	103	120
3	Sep. 20; Oct. 2, 11; Nov. 13, 28; Dec. 7, 16	11	28	39	Oct. 10	Dec. 25	59	125
4	Oct. 1, 10; Nov. 11	4	4	8	Nov. 23	Nov. 23	103	103
5	Sep. 20; Oct. 2, 11; Nov. 12, 28; Dec. 7, 16	15	20	35	Dec. 3	Dec. 24	113	134
6	Sep. 30; Oct. 1, 12; Nov. 15, 30	8	15	23	Dec. 4	Nov. 25	114	105
7	Sep. 19; Oct. 1, 9; Nov. 11, 27; Dec. 6, 16	12	21	33	Dec. 3	Dec. 20	113	130
8	Aug. 19, 24; Oct. 1, 9; Nov. 28	6	7	13	Nov. 1	Nov. 20	81	100
9	Aug. 24; Sep. 19; Oct. 1, 10, 31; Nov. 27	8	9	17	Nov. 20	Nov. 15	100	95
10	Aug. 19; Sep. 20; Oct. 2; Nov. 13, 27	3	13	16	Nov. 21	Nov. 22	101	102
11	Aug. 19, 24; Oct. 3, 12; Nov. 15, 30	3	17	20	Nov. 5	Nov. 25	85	105

TABLE II.—SUMMARY OF FEMALES KEPT IN CONFINEMENT FROM AUGUST 12, 1912.

Lot	Dates of Finding	No. of Eggs	No. Larvæ	Total Progeny	Death	Length of life — Days
1	Sep. 18; Oct. 1, 9, 31; Nov. 27; Dec. 16	20	21	41	Dec. 30	140
2	Aug. 24; Sep. 20; Oct. 3, 12	5	8	13	Oct. 20	69
3	Sep. 19; Oct. 1	0	2	2	Oct. 1	50
4	Sep. 20; Oct. 3, 12	12	3	15	Oct. 22	71
5*	Aug. 19, 24; Oct. 2, 10, 30; Nov. 27; Dec. 6, 16	27	13	40	Nov. 23*	103

*Five females. †Average time: one died after 51 days, one after 107 days, two after, 110 days and one at the end of 136 days.

The total progeny of a female for several months is not very large from these data, but I am quite sure that all of the eggs were not found; the food was changed about every ten days. At any rate, it is quite evident that both sexes are able to live some weeks and that the rate of egg-laying is slow. Also that the young larvæ are quite unable to live in dried-up cane and that the beetles require a constant supply of food. The egg stage was not accurately obtained, but it was certainly not more than a week in duration. With better care, it is quite probable that the beetles would have lived considerably longer, still reproducing. Some of the females laid fertile eggs, when isolated from males, for about four months after. The rate of oviposition was not regular, sometimes several weeks elapsing between ovipositions.

From the practical standpoint, it may be that an important fact has been learned, namely, that the adults readily feed upon and lay eggs into fresh pieces of cane cut from the plant and it would seem desirable to try this method in place of the traps or else in conjunction with them. Not only would the beetles be thus caught, but also their progeny. These pieces could be strewn about and collected, say, every week and burned. It is quite possible, however, that the traps serve the whole purpose better because they offer a hiding place and to catch and kill the beetles is to put an end to all their progeny. Van Dine, in fact, states that this is what actually occurs in the case of the trapping. What I have seen of the latter would make me believe it to be an effective and practicable remedial operation and when used in conjunction with the operations already recommended by entomologists, there should be little or no difficulty in combatting this insect.

DOCTORS BARNES AND McDUNNOUGH ON FLORIDA LEPIDOPTERA.

BY HARRISON G. DYAR, WASHINGTON, D.C.

The article by Drs. Barnes and McDunnough on pages 27-31 of the January Canadian Entomologist has been noted. The article makes the appearance of a vindication, but is so vague that it can scarcely be answered. The gentlemen plead guilty. The plea may perhaps be considered to procure an ameliorization of sentence; at least, I shall be very glad to see any of their names rescued from the sorry pile of synonymy that they have created. Of positive statements in the gentlemen's paper there are but two:

1. *Acidaliodes eoides* B. & McD. is not a *Pseudocraspedia*, but a good species. I must, of course, accept their statement of fact, which I am very glad to do.

2. *Manatha nigrita* and *Prochalia pygmaea* are separable from *Plataceticus gloveri* by the presence of vein 6 in the hind wing in the former and the absence of a branch to vein 1b of fore wing in the second. These characters are of value, I believe, and are not valueless like the condition of the radial nervules, which I had in mind in speaking of *carbonaria*. It gives me pleasure, therefore, to retract the synonymy of these species and to recognize *Manatha nigrita* as

distinct from *gloveri* by venation and larval case. I regret that I overlooked the venation in making the examination for Mr. F. M. Jones, or he might have described this also with his new species *tracyi*. *Prochalia pygmaea* is evidently more nearly related to *Chalia rileyi* Heyl. than to *gloveri*, where I placed it, hastily as it now appears. Perhaps it is the same. Heylerts describes *rileyi* with 10 veins in fore wing, 7 in hind wing. My specimens have 11 veins in fore wing, 8 in hind wing; *Prochalia pygmaea* is said to have 12 veins in fore wing, 8 in hind wing. So few specimens of these forms are known in collections that the extent of variation cannot be stated, and I will, therefore, not make a positive reference of *pygmaea* now, though I think it probable that we have but one variable species in *C. rileyi*.

THE GALL PRODUCED BY *CYSTIPHORA CANADENSIS* FELT.

BY A. COSENS, TORONTO.

In Vol. XLV, No. 12, of this publication, Dr. E. P. Felt has described a new species of gall midge; *Cystiphora canadensis* Felt, reared by the writer from galls collected in this locality. The obtaining of a large number of specimens has made possible a fuller description of the gall.

It is produced on the radical leaves of *Prenanthes alba* L. or *altissima* L. As both these species grow in this locality, and only the radical leaves are infected by the midge, it is difficult to decide which species is serving as the host.

The gall is of the typical ocellate form, with a light yellow centre from 1—2 mm. in diameter, surrounded by a deep purple ring, averaging 2 mm. in width, which is bounded on the outside by a much narrower ring of the same shade as the centre of the gall. In immature galls the circle at the centre is green and in some exceptional cases entirely absent. When the galls are formed close together on the leaves, they are often connected by the widening of their outside yellow rings. The concentric rings of colour are much more apparent on the upper than the lower surface of the leaf.

The galls are frequently so numerous on the leaves as to almost cover them. In one instance forty specimens were found on a single leaf.

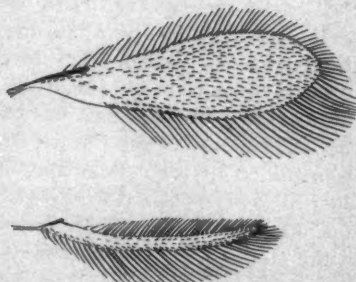
AN EGG-PARASITE OF THE TARNISHED PLANT BUG,
LYGUS PRATENSIS L.

BY C. R. CROSBY AND M. D. LEONARD, ITHACA, N. Y.

On October 3, 1913, while examining flower-heads of the daisy fleabane, *Erigeron ramosus*, we found one egg and two egg-shells of the tarnished plant bug, *Lygus pratensis*, with the tip slightly inserted in the receptacle. The flower-head was placed in a vial, and in a few days the egg took on an abnormal blackish colour. On October 7 a hymenopterous parasite emerged. From other flower-heads placed in a breeding-cage two other parasites of the same species were obtained on Oct. 21 and 27. This parasite is apparently undescribed.

***Anagrus ovijentatus*, n. sp.**

Female.—Length .64 mm., abdomen .36 mm. General colour black; eyes dark red; antennæ blackish, except pedicel below and scape at tip, which are dull yellowish. The legs dull yellowish; coxæ dusky; femora broadly banded with dusky; middle and hind tibiae dusky except tip and base; last tarsal segments dusky. Abdomen black, very slightly tinged with yellowish at the tip.

Fig. 19.—*Anagrus ovijentatus*.Fig. 20.—*A. ovijentatus*, wing.

The relative length of the antennal segments is indicated by the following ratio: scape 4, pedicel 3, first funicle 1, second 2, third, fourth, fifth and sixth 3, club 5.

The ciliation of the wing is shown in figure 20.

Described from three females, Ithaca, N.Y., Oct. 7, 21, 27, 1913.
May, 1914

Type deposited in the Cornell University collection.

According to Girault's table of the North American species of *Anagrus* (Trans. Am. Ent. Soc., XXXVII, pp. 297-298, 1911), this species runs to *A. saga* Girault. The two species may be separated by the following characters:

1. Species entirely dusky black; funicle segments of the antennæ all shorter and much smaller than the pedicle; scape and pedicle subequal; tips of tibiæ pallid. *saga* Girault.
2. Species black except for tip of abdomen, which is slightly tinged with yellowish; funicle segments of antennæ same size as scape, except first and second; scape and pedicle unequal; tips and base of tibiæ pallid. *ovijentatus*, n. sp.

BOOK REVIEWS.

THE CHINCH BUG. By T. J. Headlee and J. W. McColloch, Agr. Expt. Sta., Manhattan, Kansas. Bul. 191, p. 287-353, 1913.

This bulletin sums up the results of several years' careful study of the Chinch Bug and the various means of control. The much-debated question of the value of the artificial distribution of the fungus diseases, especially *Sporotrichum globuliferum*, which attack the bugs, has been given much attention, and in order that the conclusions reached might be based on sound grounds, a study of the life-history of the fungus itself in its relation to temperature, moisture and various hosts was carried out. From their study of the life economy of the Chinch Bug and Chinch-Bug Fungus and from the results of various experiments conducted by themselves and other entomologists in various parts of the country, the authors conclude that the facts unite in showing that artificial distribution of the chinch-bug fungus, either on diseased bugs or by artificial cultures, is not worth the time and trouble it takes. They state, moreover, that the farmers of Kansas have lost millions by the advocacy of this method of control because it tended to encourage them to neglect known really efficient measures.

The study of why bunch grass makes practically the only safe winter quarters for the bugs gave interesting results and seems largely to explain why the proper burning of such hiding quarters in early winter has given so good results. The two great artificial

methods of control, namely, this burning of the bunch grass to destroy the hibernating insects and the dust barriers to prevent migration or to destroy the nymphs when migrating from wheat to corn, are very clearly explained and the grounds on which they are advocated are set forth in a convincing manner. So far as one can judge, the Bulletin should be very valuable to the farmers of Kansas and to any who have to study and combat this very destructive pest.

L. CAESAR.

THE HESSIAN FLY. By T. J. Headlee and J. B. Parker, Agr. Expt. Sta. Manhattan, Kansas, Bul. 188, pp. 83-138, 1913.

This is a technical bulletin giving a comprehensive account of the Hessian Fly in Kansas. The authors, however, have not limited themselves solely to Kansas conditions, but have made several very important references to the results obtained by other investigators in different parts of the United States, whenever by so doing they could make more clear the point at issue. The history, distribution, habits, life history, nature of injury, natural and artificial means of control have been discussed at considerable length. The most valuable parts of the bulletin deal with the effects of temperature and moisture on the insect; the part played by parasites; the uselessness or inadvisability of several advocated measures of control, and the effectiveness of other methods.

None of the measures advocated are new, but new data are given to prove more fully their value and considerable attention has been paid to answering the objections that have been made to them. The control measures advocated are (a) destruction of the insects on infested stubble preferably by ploughing under, (b) destruction of volunteer wheat, and (c) late sowing. In addition to these, the importance of a fertile, well-prepared seed-bed and good seed are emphasized. It is shown that climatic conditions and parasites play a very important part in control, but that they can never be relied upon to take the place of the measures just mentioned. Though the bulletin describes Kansas conditions, almost everything that it contains has a direct bearing upon this pest in Canada or elsewhere and is also very valuable by way of comparison with our local conditions.

L. CAESAR.

BOMBYCIA IMPROVISA AND TEARLII HY. EDWARDS.

I have in my collection one specimen of *Bombycia improvisa*, taken at Ladysmith, Vancouver Island, Oct. 10, 1907, which I compared with specimens so labelled in the cabinets of the late G. W. Taylor, of Wellington, B. C., but on further examination I found that the specimens did not agree with the figure of *improvisa* in Holland's Motto Book.

The specimen was submitted to the late Dr. J. B. Smith, who wrote me under date of April, 1908: "The determination is correct. I never noticed before that Holland makes *tearlui* a synonym of *improvisa*. It is not. He figures *tearlui*, and not *improvisa*."

In Dyar's Catalogue *tearlui* is noted as a synonym of *improvisa*.

This season I have been fortunate in securing two specimens of *tearlui*, identical with that figured by Holland and entirely distinct from the specimens of *improvisa* of Vancouver Island.

The correction must therefore be made in Holland's work, and the name *tearlui* be restored to its place in our nomenclature.

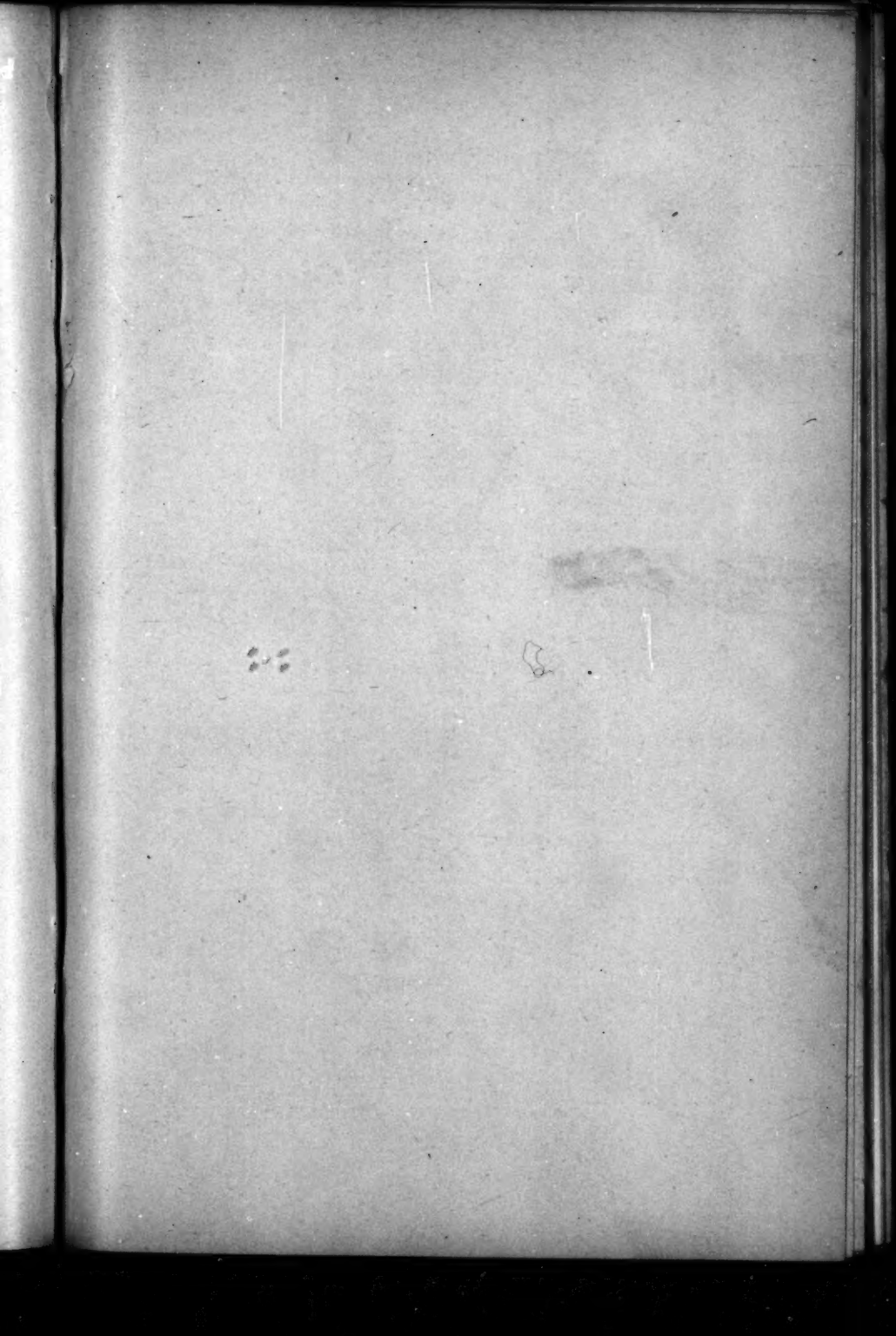
J. W. COCKLE, Kaslo, B. C.

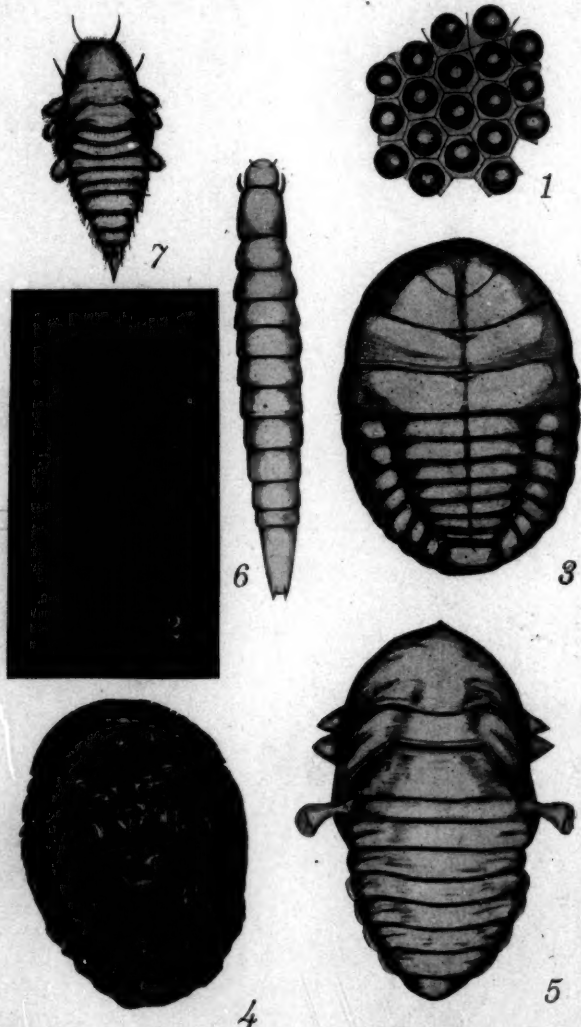
THE LONDON BIOLOGICAL CLUB.

A society with the above title has recently been formed in London, Ontario, the organization consisting of a general club for conducting the business of the whole and of a number of sections devoted to special departments of biology. The objects of the club are stated to be: "(a) the development and advancement of the study of biology in general and of the subjects represented by the sections in particular; (b) the conservation of living things, including man and all useful to him; (c) the economic and scientific destruction of such living things as can be shown inimical to man."

The wide scope of the club is set forth in the bylaw relating to sections which, it states, may be organized to deal with the following subjects: Archaeology, Bacteriology, Botany, Entomology, Ethnology, Ichthyology, Paleontology, Psychology, Ornithology, Sociology, Zoology, Bees, Poultry, Horses, Dogs, Cats, etc. It is provided further that any members, not less than three in number, may apply for the creation of a new section on any other subject relating to Biology. The club has begun with a fairly large membership, and with such an extensive field of operations should attract a great number of persons who take an intelligent interest in matters outside of their daily routine of work.

Mailed May 7th, 1914.





PSEPHENUS LECONTEI AND STENELMIS BICARINATUS.

